

A REVIEW OF THE OESOPHAGOSTOMES IN THE COLLECTION OF THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE

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The material available for examination was as follows :—

1. *Oesophagostomum columbianum* from ileum of a Merino sheep.
2. *Oesophagostomum columbianum* from fourth stomach and small intestine of a sheep, Nairobi.
3. *Oesophagostomum columbianum* nodules from the small intestine of a sheep, Nairobi.
4. *Oesophagostomum columbianum* from duodenum of goat.
5. *Oesophagostomum columbianum* from a water buck, Ngoa, North-eastern Rhodesia.
6. *Oesophagostomum venulosum* from goat.
7. *Oesophagostomum venulosum* from lamb, Pwllheli, North Wales.
8. *Oesophagostomum radiatum* from caecum and large intestine of zebu.
9. *Oesophagostomum dentatum* from pig, Suffolk.
10. *Oesophagostomum mwanzae* from caecum and colon of wart hog (*Phacocaerus aethiopicus*), Rhodesia.
11. *Oesophagostomum eurycephalum* from caecum and colon of wart hog, Rhodesia.
12. *Oesophagostomum simpsoni* from caecum and colon of wart hog, Rhodesia.
13. *Oesophagostomum oldi* from caecum and colon of wart hog, Rhodesia.
14. *Oesophagostomum yorkei*, n.sp. from caecum and colon of wart hog, Rhodesia.
15. *Oesophagostomum ventri* n.sp. from stomach of Brazilian wild cat.
16. *Oesophagostomum brumpti* from chimpanzee (*Anthropopithecus* sp.)

Genus *Oesophagostomum*, Molin, 1861.

It is not proposed to use the subgenera *Hysteracrum*, *Oesophagostomum* and *Proteracrum* created by Railliet (1919) for the oesophagostomes of *Artiodactyla*. The discovery of several new species of the genus *Oesophagostomum* from the roan antelope (*Hippotragus equinus*) and the wart hog (*Phacocaerus aethiopicus*) has led one to realise the limitations of Railliet's subgenera. Neither Daubney's new species *O. mwanzae*, though it agrees most nearly with the subgenus *Proteracrum*, nor *O. eurycephalum* and *O. oldi* of Goodey (1924), can be included in any of these. It seems, then, that in regard to the genus *Oesophagostomum* one is fast approaching the stage where a subgenus will hold but a single species, obviously an untenable position. Goodey says of this :

'We have in the genus *Oesophagostomum* a neat and compact array of species which resemble the type species of the genus (*O. dentatum*) on broad lines, as for example in possessing a mouth collar with circumoral papillae, mouth with, or in one case, without external leaf crown, a cephalic vesicle generally inflated. The spicules and gubernaculum similar in structure and appearance, genital cone built on same general plan throughout all the species and ovijector apparatus also similar in all the species.'

On these grounds it is suggested that the genus be maintained intact. Further classification, if the number of species rendered the genus unwieldy, should include, in addition to the oesophagostomes of the *Artiodactyla*, those of Primates, Man, Rodentia, Carnivora and all other oesophagostomes without regard to the animal host. Grouping according to the animal host, as Railliet has done, is unsatisfactory, for there is a close relationship between *O. ventri* from the Brazilian wild cat and *O. stephanostomum* from man, and between *O. xeri* of the ground squirrel and *O. brumpti* of man.

Oesophagostomum columbianum (Curtice, 1890) Stossich, 1899.

Ransom (1911) says that this worm is found in the large intestine ; but it will be noticed that of the five lots of material collected, two from Nairobi, from Natal, from Queensland and North-eastern Rhodesia, all the worms were collected from the abomasum (fourth stomach) or small intestine. It appears to be the commonest oesophagostome of ruminants in Africa and America and is responsible for the so-called ' pimply gut ' of sheep. Theiler (1921) says ' very few sheep

pass our post-mortem table in which they are absent.' He further distinguishes two fatal sequelae to a severe infection, (1) a septic infection of the serous cavities due to the rupture of one or more intestinal nodules and, (2) an invagination of the ileum. To my knowledge severe infestations due to oesophagostomes, or such sequelae, are unheard of in England.

Descriptions of this nematode are given by Ransom, and more recently, by Goodey (1924). Curtice (1890) says of the two leaf crowns, 'There are twenty-four elements in each.' Giles agrees with him, but figures the inner row as typical bidentate elements. In the specimens I have examined there seems little doubt that the internal crown is composed of 48, twice as many elements as the external. Giles probably mistook two adjoining teeth for a larger bidentate one. *O. columbianum* has not previously been recorded from the water buck.

Oesophagostomum venulosum (Rudolphi, 1809) Railliet, 1896.

This is the commonest oesophagostome of the domesticated animals in England. Morgan says in his survey of the Aberystwyth area of Wales, '*O. venulosum* has been frequently found in the large intestine of sheep, but only in small numbers.' Ransom gives the number of elements in the external and internal leaf crowns as not more than sixteen processes in each worm. There is no doubt that, as in *O. columbianum*, the internal leaf crown is composed of twice as many elements as the external.

Oesophagostomum radiatum (Rudolphi, 1803) Railliet, 1898.

Some fifteen specimens were taken from the caecum and colon of the zebu. It has not been previously recorded from this host. Other recorded hosts are *Bos taurus* and the water buffalo. In the male bursa the common stem of the lateral rays projects dorsally, forming a protuberance at the root of the postero-lateral ray, an arrangement which is found in the bursae of all the oesophagostomes of the wart hog.

Oesophagostomum dentatum, Rud, 1803.

Fairly common in the caecum and colon of pigs in England, and when present they are usually very numerous.

Oesophagostomum eurycephalum, Goodey, 1924.

Recorded by Goodey from the roan antelope and found by me in material collected from the African wart hog (*Phacocaerus aethiopicus*). It has not been previously recorded from this latter host.

My description and drawings, completed before the publication of Goodey's paper, agree closely with his. As regards the external leaf crown he says it is composed of eight stout elements whose tips curve outwardly, whilst in many of my specimens the tips projected vertically out of the mouth opening. Goodey states that the prebursal papillae are absent or so small as to be undiscernible, but I found these, though small, lying at the level of the anterior end of the gubernaculum. The caudal papillae are prominent, situated about 24μ from the tip of the tail. My measurements, agreeing in the main with those of Goodey, differ in some respects. Male length 15 mm. (Goodey 9 to 10 mm.) by 0.6 mm. in breadth. Length of oesophagus 705μ , posterior breadth 196μ . Breadth of buccal capsule 112μ , length 41μ . Distance of ventral slit from anterior extremity 512μ . Distance of cervical papillae from anterior extremity 426μ . Spicules are 1.49 mm. in length, cross-striated and 'winged' at their distal extremities. Female 16 to 17 mm. in length (Goodey 10 to 12 mm.) by 0.5 mm. in breadth. Oesophagus 750 to 900μ in length, posterior swelling 200 to 260μ in breadth. Buccal capsule 150μ in breadth by 50μ high. Vulva 380 to 420μ from tip of tail. Vagina 160 to 180μ in length, almost transverse. Ovipositor stout, 320μ in length. Anus to tip of tail 130μ . Eggs 90μ by 56μ .

In the male bursa the outer terminal division of the dorsal ray is as thick as, but only one-quarter the length of, the inner division.

Oesophagostomum mwanzae, Daubney, 1924.

From caecum and colon of wart hog, Rhodesia. It is the commonest oesophagostome of the wart hog. Lateral cephalic papillae conical and blunt; submedian elongated, with a distal rod-like portion usually bent inwards. Buccal capsule ellipsoidal in cross-section. Seen from lateral aspect the walls diverge

anteriorly; from the dorso-ventral aspect they appear to converge anteriorly. The external leaf crown is composed of six elements, each one long and pointed, arising from base of buccal capsule. There is no internal leaf crown. The cervical groove does not extend as far as the lateral lines. The intestine at its commencement is wider than the oesophagus, pigmented, though not so deeply as in *O. dentatum* and runs a straight course to the anus. Bursa has a well-defined dorsal lobe well separated from the two lateral lobes and is longer than them. The externo-dorsal ray is bent abruptly downwards at its middle. The medio-lateral and postero-lateral rays are joined and also the ventro-ventral and latero-ventral rays. The dorsal ray was unusually stout in the specimens I examined. The outer division of each main branch is as thick as the inner, but about half its length; gubernaculum 100 to 120 μ (Goodey 160 μ) in length and trowel shaped. Daubney (1924) figures the handle portion as flexed dorsally, but in my specimens this part was practically straight. Seen laterally under high powers, the gubernaculum is produced at its distal extremity into a hook-like process.

The female possesses small caudal papillae, situated laterally about 30 μ from the tip of the tail. My measurements differ slightly from those of Goodey. Length of male 11 to 12.2 mm. (Goodey 13 to 16 mm.), 430 to 470 μ in breadth, ventral slit 280 to 295 μ from anterior extremity (Goodey 0.2 mm., Daubney 0.22 mm.). Buccal capsule dorso-ventral diameter 100 μ (Daubney 126 μ).

Female 14.7 to 18 mm. in length (Goodey 16 to 20 mm.). Anus to tip of tail 125 to 176 μ , vulva to tip of tail 300 to 360 μ . Eggs segmented when laid, 64 to 71.4 μ long by 34 to 37.4 μ in breadth.

Daubney, in discussing the position of *O. mwanzae* in the genus, suggests that it shows near affinities to *O. apiostomum* and *O. brumpti*. I cannot agree with this, for I regard the shape of the buccal capsule in *O. brumpti* and *O. apiostomum* (that of a rather thin-walled truncated cone) as one of the chief characters and in *O. mwanzae* the walls, seen laterally, are ellipsoidal and diverge anteriorly. The new sub-genus, *Conoweberia*, created by Ihle (1922) to include *O. apiostomum* and *O. brumpti*, indicates the importance attached by him to the shape of the buccal capsule.

Goodey considers *O. mwanzae* most nearly akin to *O. simpsoni* in the elliptical shape of the head, leaf crowns, etc., but not in the

shape of the female tail and the oesophagus. This opinion is justified, for although he was in possession of only female specimens of *O. simpsoni*, my description of the male bursa of the latter shows that it bears a marked resemblance to that of *O. mwanzae*. In *O. simpsoni* and *O. mwanzae* the dorsal lobe is longer than the lateral lobes, the externo-lateral ray is closely applied to the medio-lateral at its origin and the outer border of the main stem possesses a rounded knob at the point of origin of the postero-lateral ray. This knob exists in all the bursae of the oesophagostomes occurring in the wart hog. Of the other oesophagostomes only *O. radiatum* possesses it.

Oesophagostomum simpsoni, Goodey, 1924.

The material consisted of some four males and twelve females, collected from the caecum and colon of the wart hog, Rhodesia—Goodey possessed no male specimens. A rather stout species with a breadth-length ratio of 1 : 21. The body tapers gradually from the anterior two-fifths towards each extremity, the anterior extremity being truncated. The mouth collar is very flat, almost disc like, and elliptical in cross-section. The dorso-ventral diameter of the buccal capsule is the greater, being 105 to 130 μ , while the lateral diameter is 74 to 80 μ . The external leaf crown is composed of eight stout elements arising from base of buccal capsule and projecting beyond the mouth collar, with slightly divergent points. There is no internal leaf crown.

The lateral cephalic papillae are very blunt and scarcely elevate the cuticle. The submedian are elongated, inclined inwards, and have a small knob-like distal portion. The cephalic vesicle is well-developed, giving the anterior extremity, under low power magnification, an appearance not unlike the head of a match.

The cervical groove is well-defined ventrally and extends as far as the lateral lines. The cuticular inflation is continued for a short distance beyond the groove, becoming lost opposite the commencement of the intestine. There are no lateral membranes, hence the stretched-out position of the worms when fixed. The cervical papillae, similar to those of *O. dentatum*, lie opposite the posterior swelling of the oesophagus.

The oesophagus is very short and broad, scarcely enlarging

posteriorly and flattened dorso-ventrally corresponding to the shape of the mouth capsule. Its breadth-length ratio is 1 : 2.2. In *O. dentatum* it is 1 : 3.5. At the entrance to the oesophagus there is no oesophageal funnel, but at this level the oesophagus presents a short sub-globular swelling, constricts slightly at the level of the nerve ring, finally enlarging slightly and projecting for a short distance into the intestine. The intestine at its commencement is only slightly larger than the oesophagus.

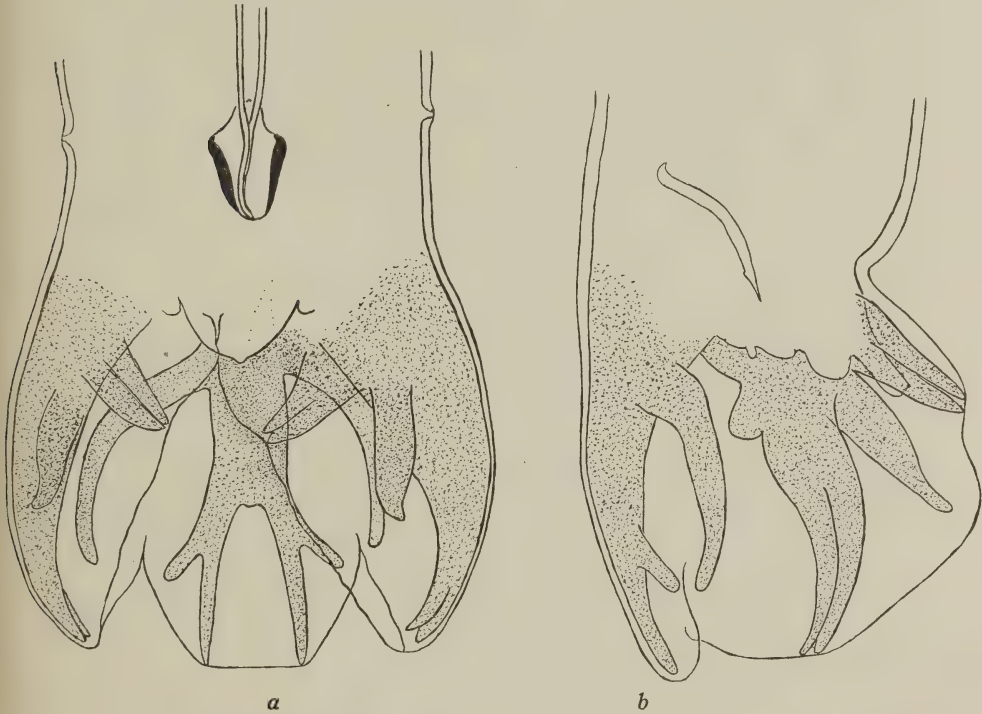


FIG. 1. *Oesophagostomum simpsoni*, Goodey. *a*.—Male bursa, ventral view; *b*.—Same, lateral view.

The male worm has an average length of 15 mm. by 740μ broad. The oesophagus is 426μ long by 190 to 200μ broad. The ventral groove is 245μ from the anterior extremity and the cervical papillae 95μ behind this. The bursa has its dorsal lobe well separated on either side from the lateral lobes by a deep fissure, but the dorsal lobe itself is not deeply indented, though slightly longer than the lateral lobes. Prebursal papillae are present and lie opposite the anterior end of the gubernaculum. The bursal formula agrees

with that of the oesophagostomes. The ventral rays are normal and their tips reach the edge of the bursa. The externo-lateral is closely applied to the medio-lateral at its origin, then becomes well separated from it. Broader than either of the lateral rays at its origin, it becomes narrowed rather suddenly towards its extremity. The outer border of the main stem of the lateral rays, as in *O. radiatum*, *O. eurycephalum* and *O. mwanzae*, possesses a rounded knob at the point of origin of the postero-lateral ray. The lateral rays reach the edge of the bursa and their tips are strongly curved towards the dorsal rays.

The angle caused by the division of the main dorsal ray is acute ; the outer terminal division of the dorsal ray is as thick as, but less than half the length of the inner terminal division and is inclined outwards. The gubernaculum is trowel-shaped, similar to that of *O. dentatum*. It is 130 to 160 μ long and not markedly bent in its centre. Seen laterally the distal extremity is barbed on its dorsal aspect. The spicules are equal, alate, and appear fused at their tips.

The female worm is 15 to 21 mm. long, 0.7 to 1.05 mm. broad. The oesophagus is 430 to 460 μ long by 210 to 220 μ broad. The ventral slit is about 230 μ from the anterior extremity, the cervical papillae 100 μ behind this. Behind the genital opening the tail is straight and constricts gradually to the anus, terminating behind this in a conical point, on either side of which lies a caudal papilla. The vulva is salient and the vagina is about 150 μ long and transverse. There is a double muscular ovijector about 320 μ long from which two uteri run forwards. The vulva is 500 to 700 μ in front of the posterior extremity, the anus 140 to 170 μ from the tip of the tail.

Oesophagostomum oldi, Goodey, 1924.

In examining the wart hog material, I had found and described a worm agreeing closely with Goodey's new species *O. oldi*. In the main my description and measurements agree with his, but there are several differences I wish to record.

The cephalic vesicle is but slightly developed ; anterior to the cervical groove are a number of lesser circular grooves three to four in number which indent the cuticle. Goodey makes no mention of these. As the worms had been excellently preserved I cannot regard these grooves as due to shrinking of the cuticle.

Goodey notes that the external leaf crown does not arise from the base of the buccal capsule. In my specimens it takes its origin from the lower fifth of the wall.

The male measures 9.3 to 12.4 mm. in length (Goodey 11 to 13 mm.). Female 7 to 14 mm. (Goodey 15 to 18 mm.).

The tail of the female bears resemblance to the human foot, though in my specimens there is a sharp depression, not figured by Goodey, which separates the vulva and anus. Caudal papillae are prominent and slightly asymmetrical, 80 to 140 μ from the tip.

The constant difference between my specimens and his lies in the length of the vagina. It is very long in both, but while Goodey gives its length as 0.8 to 1 mm., it measured in my specimens an average of 1.6 mm. and never less than 1.3 mm. The other characteristics, however, agree so closely with *O. oldi* that on these differences one is hardly justified in founding a separate species.

Oesophagostomum yorkei, n.sp.

Four females and two males were collected by Professor Yorke in Rhodesia, from caecum and colon of *Phacocærus aethiopicus*.

Male about 10 mm. long by 0.4 mm. in breadth, females 14 to 15.3 mm. long by 0.65 mm. in breadth.

Mouth collar inflated, slightly elliptical in cross section. The cephalic papillae have their usual disposition, laterals blunt, submedian, long and prominent.

The cephalic vesicle is scarcely inflated. Cervical groove extends from ventral surface as far as lateral lines and is 240 to 260 μ from the anterior extremity. Between the cervical groove and the head are three or four lesser grooves which indent the cuticle. The cervical papillae are like those of *O. dentatum* and are about 330 μ from the anterior extremity. The mouth opening is slightly elliptical in cross section. There is an external leaf crown of eight large elements whose points project vertically beyond the mouth opening. These elements arise from the base of the inner wall of the mouth capsule. There is no internal leaf crown. The buccal capsule is about 40 μ in height by 55 μ in breadth. The walls in optical section appear parallel and ellipsoidal, but are constricted in their anterior fourth to form a neck. The body wall is connected by strands with the posterior aspect of the buccal capsule.

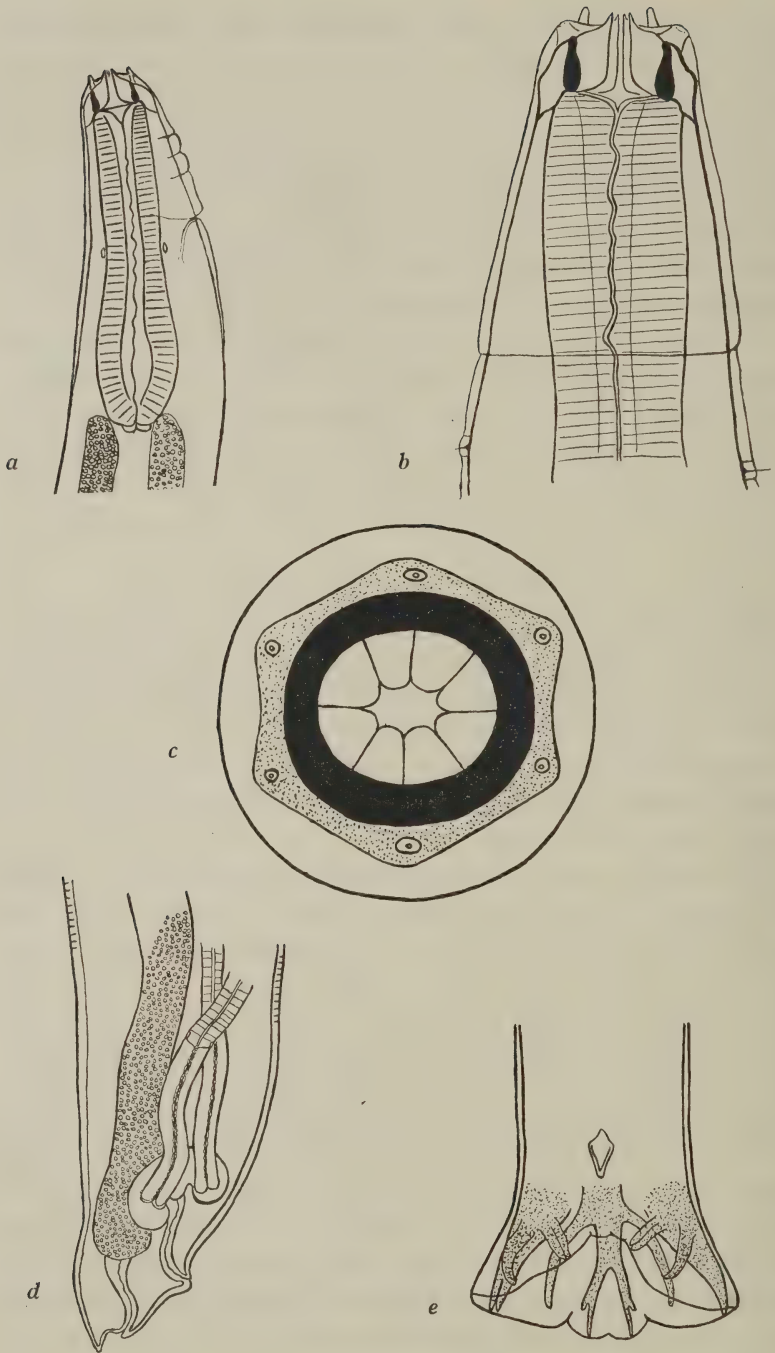


FIG. 2. *Oesophagostomum yorkei*, n.sp. *a.*—Anterior end, lateral view; *b.*—Same, ventral view, more highly magnified; *c.*—End-on view of head; *d.*—Tail end of female; *e.*—Male bursa, ventra view, somewhat flattened.

The oesophagus is about 550μ in length, of equal thickness in its anterior three fourths; it then dilates, being here about 150μ in breadth. Oesophageal-intestinal valves small. There is an oesophageal funnel about 40μ deep lined by cuticle, but there are no teeth. The nerve ring is just behind the cervical groove.

The body is of equal width as far as the vulva, then tapers abruptly to a small, straight, conical tail. The vulva has salient lips and is about 260μ from the tip of the tail. The vagina is 190 to 210μ in length, has stout walls and is directed forwards to a double muscular ovjector about 240μ in breadth. From it two uteri run directly forwards. The rectum is about 190μ long and the anus 80μ from the tip of the tail.

Male. The bursa is deep and not expanded to a greater width from the rest of the body. The dorsal lobe is separated from the lateral lobes on either side by a fissure and is slightly indented in the middle line. The terminal divisions of the main dorsal ray are slender and the outer terminal division is directed straight backwards. As in *O. oldi* and *O. eurycephalum* there is a distinct rounded knob on the posterior border of the main lateral trunk at the origin of the postero-lateral ray; externo-dorsal rays given off close to base of dorsal ray and are long and slender. Spicules are alate with their tips bent dorsally; they are short, 1.3 mm., corresponding to shortness of vagina in female. The gubernaculum is shovel-shaped, 130μ long.

This worm appears to occupy an intermediate position as regards its relationship to the other oesophagostomes of the wart hog; it resembles *O. oldi* in the shape of the oesophagus and the presence of a well-marked oesophageal funnel without teeth. Also in the shape of the buccal capsule and the shape and structure of the male bursa. It bears, however, an even closer resemblance to *O. eurycephalum* in the number of elements in the leaf crown and, in regard to the tail, the abrupt narrowing behind the vulva, the short almost transverse vagina and the vulva with salient lips.

This parasite has been named in honour of Professor Warrington Yorke of the Liverpool School of Tropical Medicine.

Oesophagostomum ventri, n.sp.

These worms, consisting of two males and fifteen females, were obtained by Dr. Thomas from the stomach of a Brazilian wild cat, together with numerous specimens of *Toxascaris marginata*. Taking into account the fact that oesophagostomes are found usually in the caecum and large colon and that available literature shows no record of the wild cat as a host of this genus, one was naturally led to the assumption that these worms were spurious parasites—the worms being found in the intestine post-mortem—owing to the cat having eaten the intestine of some other animal a short time before death.

Against this contention is the fact that the worms were in an excellent state of preservation, while the presence, in the stomach also, of specimens of *Toxascaris marginata* would serve to strengthen the evidence that these oesophagostomes were true parasites of the cat.

This worm, then, is regarded as a new species from the cat. Further evidence may show this new oesophagostome to be normally parasitic in some other animal, possibly one of the smaller rodents, which then becomes the true host.

Description. The worms are whitish, body practically straight, of maximum diameter at the junction of the middle and anterior fifths and diminishing gradually towards each extremity. The anterior end is truncated, the mouth collar being broad and shallow and separated from the body by a well-defined groove. There are six head papillae. The laterals are broad and flat and scarcely protrude above the surface. The sub-median are conical, not very prominent and the rather delicate pulp projecting into them from below gives each papilla in optical section an appearance not unlike the head of an arrow.

The buccal capsule is shallow, its height to breadth ratio being 1:4. The walls in section appear 'comma' shaped, thicker anteriorly and convex on their inner aspects. From the base of the wall a chitinous ridge runs downwards and outwards to reach the body wall.

The external leaf crown arises from the anterior border of the buccal capsule. It is composed of some 45 slender pointed elements

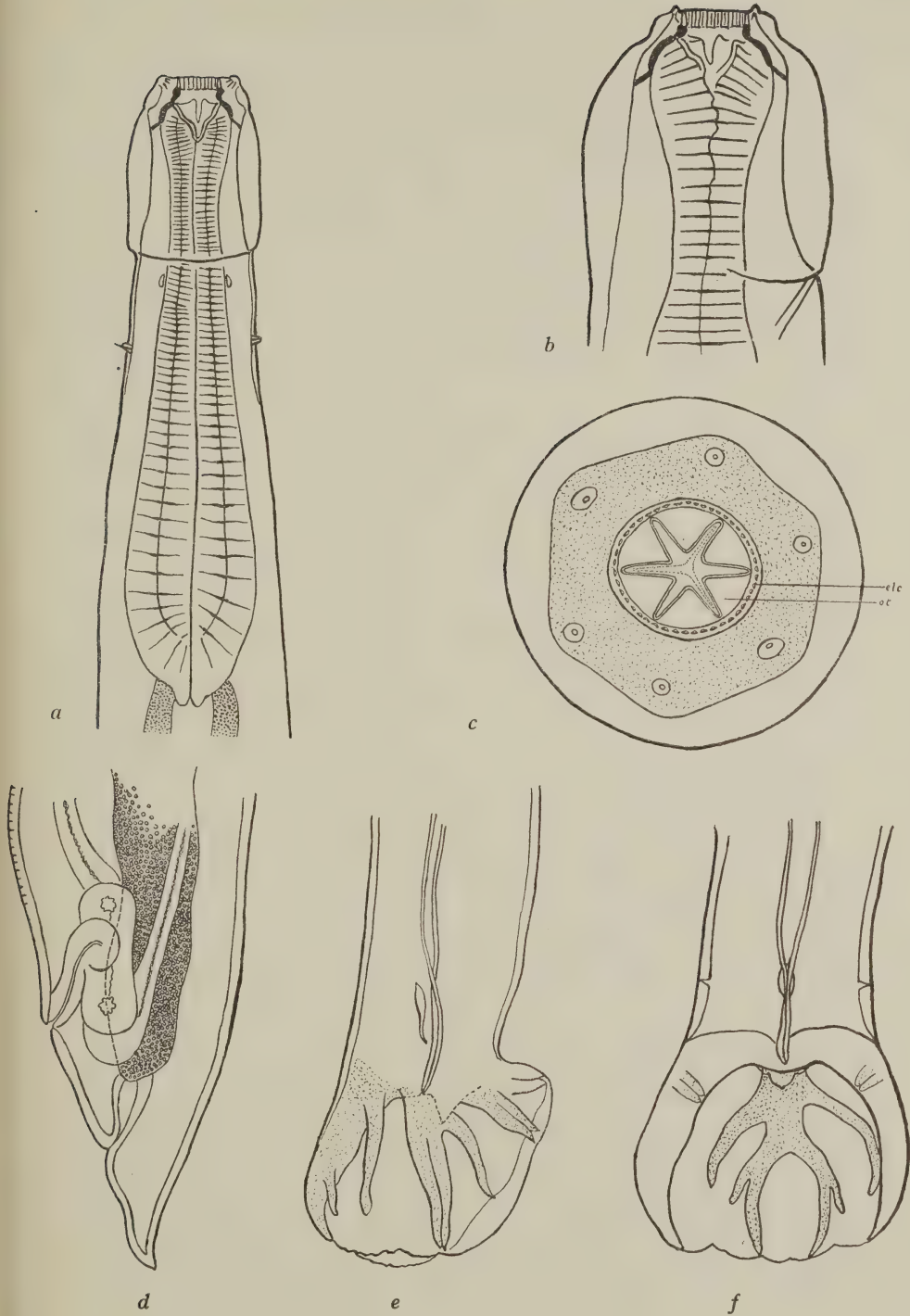


FIG. 3. *Oesopbagostomum ventri*, n.sp. a.—Anterior end, seen ventrally; b.—Same, lateral view, more highly magnified; c.—End-on view of head; *e.l.c.*—External leaf crown, *o.t.*—oesophageal tooth; d.—Tail end of female; e.—Male bursa, lateral view; f.—Same, ventral view.

projecting directly forwards, but not extending beyond the mouth opening. There is no internal leaf crown. The cephalic vesicle is well-defined, constricted inferiorly by a groove extending from the ventral surface as far as the lateral lines. The excretory duct opens at this level and the nerve ring is found just behind this.

There is a large oesophageal funnel whose chitinous lining is modified to form six large teeth, their slightly acute points being directed upwards and inwards. Two teeth correspond to each oesophageal sector. The tooth of one sector is widely separated from its fellow, but lies in apposition with the tooth of the adjoining sector.

The oesophagus is long, narrows directly behind the oesophageal funnel, then gradually dilates to its posterior fifth. The cervical papillae lie just anterior to the middle of the oesophagus.

Female. Length 20 to 23 mm. by 670 to 700μ broad. The cuticular striations are about 17μ distant at the centre. The oesophagus is 1.23 to 1.26 mm. in length, posterior breadth about 260μ . The buccal capsule is about 80μ broad by 20μ high. Distance of ventral slit from anterior extremity 330 to 360μ . Cervical papillae about 540μ from anterior extremity. Caudal papillae are present on either side of the tail about 50μ from the tip. The tail is straight and slender, tapering gradually behind the vulva. The tip of the tail is sometimes bent dorsally.

The vulva is salient about 560μ from the tip. Vagina almost transverse, 190 to 260μ in length, and runs to a double muscular ovijector 200 to 270μ in length. From its extremities run two uteri, the anterior running directly forwards, the posterior running backwards, but curving almost immediately to run forwards again. The anus is non-salient, 180 to 260μ from the tip of the tail.

Male. About 21 mm. in length, 690μ broad. Length of oesophagus 1.23 mm., posterior breadth 230 mm. Buccal capsule 78μ broad by 19μ high. Distance from anterior extremity to ventral slit 340μ , to cervical papillae 508μ . The bursal formula agrees with that of the genus *Oesophagostomum*. The left externo-dorsal ray becomes detached from the main dorsal branch at about its own width above the right. The inner and outer terminal division of the dorsal ray are both slender, the former being about three times as long with slightly incurved extremities. The externo-

lateral ray is well separated from the medio-lateral throughout its length and its tip reaches nearer to the edge of the bursa than does the externo-dorsal. The spicules are equal, tubular and non-alate, with fused tips. They are 1.32 to 1.47 mm. in length. The gubernaculum, unlike that of *O. dentatum*, is lozenge-shaped, about 135μ in length. Seen laterally it is not bent markedly at its middle, but is almost straight and tapers from above. Prebursal papillae are present at the level of the gubernaculum.

In considering the relationship between this worm and the other oesophagostomes one was struck with the remarkable similarity between it and *Oesophagostomum stephanostomum* var. *Thomasi*. These latter parasites were obtained by Dr. Thomas from the intestine of a Brazilian prisoner who died in Manáos. Both are indigenous to Brazil. Railliet and Henry consider Thomas's oesophagostome, *O. dentigerum*, Railliet and Henry, 1906, from the chimpanzee and *O. stephanostomum*, Stossich, 1904, from the gorilla, are simply varieties of the one species. The only constant difference between them lies in the disposition of the terminal divisions of the posterior ray in the male bursa. With Clayton Lane I would hesitate to attach even subspecific value to this character.

Comparison with these types leads one to state that *O. ventri* is a separate species differing from *O. stephanostomum* var. *Thomasi* in the following respects:—

TABLE I

	<i>O. stephanostomum</i> var. <i>Thomasi</i>	<i>O. ventri</i> , n.sp.
External leaf crown	38 elements	45 elements
Internal leaf crown	76 small elements	None
Sub-median head papillae ...	Rounded, but tip produced to sharp point	Conical
Buccal capsule	Ellipsoidal in optical section ...	'Comma'-shaped in optical section
Spicules	Tips free	Tips fused
Posterior bursal ray	Outer terminal division incurved	Outer terminal division parallel to inner
Oesophageal teeth	Six teeth equally spaced ...	Six teeth arranged in three pairs

In all other respects, *e.g.*, length of spicules, position of cervical papillae, shape of tail, position of vulva and length of vagina, *O. ventri* corresponds closely with *O. stephanostomum* var. *Thomasi*.

It would seem that this carnivoran oesophagostome bears a much closer relationship to the oesophagostomes of Man and Primates than it does to the oesophagostomes of Rodentia and the Artiodactyla.

I propose for this worm the specific name *O. ventri* to mark the unusual location in the host in which it was found.

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